ALASKA NATURAL GAS TRANSPORTATION PROJECTS
OFFICE OF THE FEDERAL COORDINATOR

A guide to Alaska natural gas projects

Ideas for moving Prudhoe Bay's natural gas bounty off Alaska's North Slope are as plentiful as cottonwood seed in the June air.

Some are modest: Truck small amounts of gas to Fairbanks consumers.

Some are epic: Pipe massive amounts to Lower 48 consumers — the most expensive North American private-sector construction project ever.

Some are pinned to visions of an Alaska energy utopia, where gas for local use is plentiful and relatively cheap, the oil industry reawakens to develop new fields by the dozen, the state treasury overflows with wealth, and new industries sprout from the earth like wild lupine.

Some are backed by tens or even hundreds of millions of dollars to design, engineer and otherwise prepare for construction. These include the major pipeline through Canada and a much more modest pipeline to Southcentral Alaska.

Some are little more than a concept looking to catch on.

The great North Slope oil discoveries of the 1960s and 1970s also found an estimated 35 trillion cubic feet of natural gas - one and a half times the entire volume of U.S. production last year. The U.S. Geological Survey estimates an additional 221 trillion cubic feet await discovery in Alaska's Arctic, onshore and offshore. If only an economically viable way could be found to move the gas to consumers.

Below we summarize several proposals — big and small — for transporting natural gas from Alaska's North Slope.

Pipeline to Alberta

Project Information
Sponsor: TransCanada/ ExxonMobil (the Alaska Pipeline Project)
Estimated cost: $32 billion to $41 billion (2009 dollars)
Route: Parallel the trans-Alaska oil pipeline from Prudhoe Bay to Delta Junction, then continue into Canada roughly parallel to the Alaska Highway
Gas for Alaskans: Minimum of 5 take-off points available in Alaska
Status: Preparing application to the Federal Energy Regulatory Commission

This involves an approximately 1,700-mile, 48-inch buried pipeline from the Prudhoe Bay field on Alaska's North Slope to the British Columbia-Alberta border in Canada. From there, the gas could flow to the Lower 48 via an extensive network of existing pipelines.

The gasline would parallel the trans-Alaska oil pipeline from Prudhoe Bay to Delta Junction, then continue into Canada roughly parallel to the Alaska Highway.

The pipeline would move up to 4.5 billion cubic feet of gas per day.

The project includes a 58-mile pipeline to Prudhoe Bay from the Point Thomson gas field.

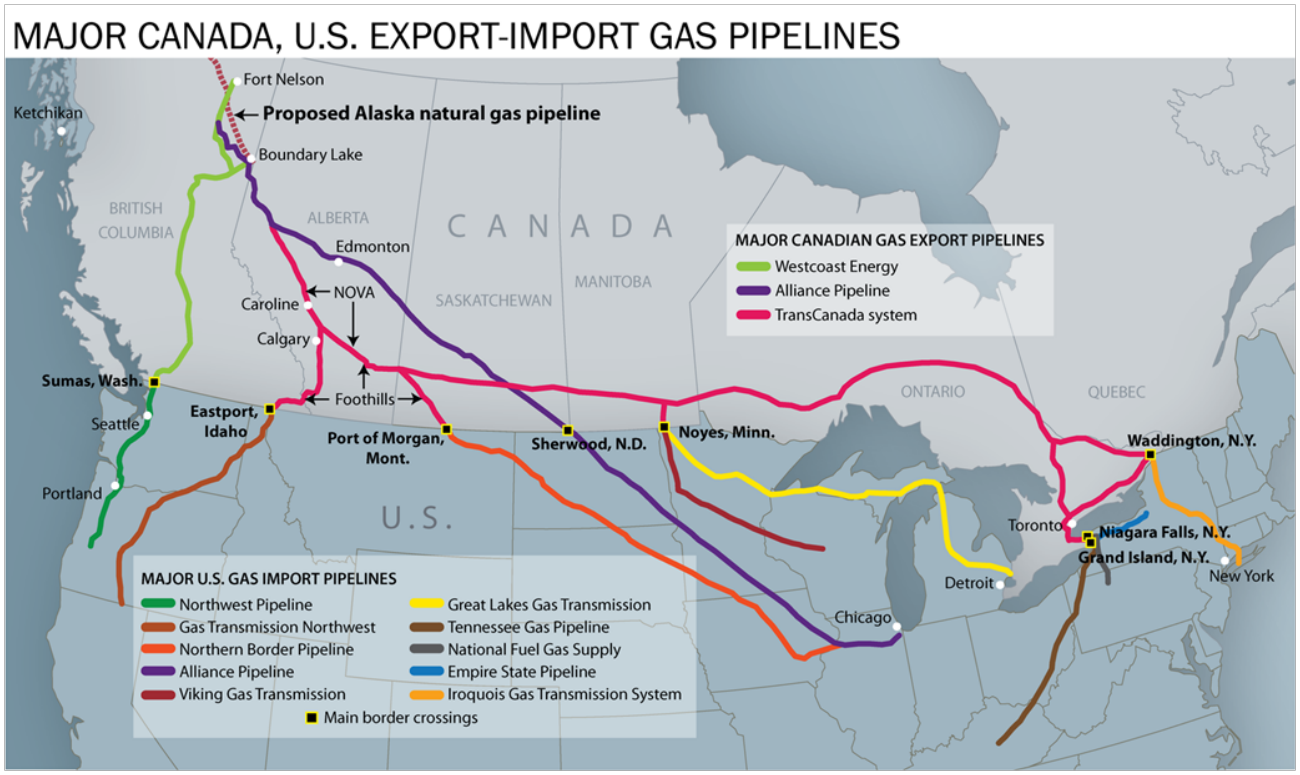
Sponsor

TransCanada and ExxonMobil, also known as the Alaska Pipeline Project.

Estimated cost

$32 billion to $41 billion (2009 dollars).

The cost includes a $12 billion gas treatment plant at the Prudhoe Bay field to remove water, carbon dioxide and other impurities from the gas, then compress the raw gas before it enters the pipeline.



Gas for Alaskans

The pipeline would provide at least five points in Alaska from which spur lines could be built to provide gas to Alaskans. The APP project involves only providing gas takeoff points, not construction of the spur lines, which would be up to the state, utilities or private companies.

Status

In the development stage. The project sponsor is refining details - from the physical pipeline to the exact route - and seeking customers to ship gas through the line.

The Alaska Pipeline Project spent an estimated $288 million from the project onset through June 2011 and plans to spend $209 million more during the following 12 months. Under the Alaska Gasline Inducement Act of 2007, the state plans to reimburse the sponsor for up to $500 million of its estimated $717 million in pre-construction costs.

Besides refining the project's design and engineering, the sponsor is gathering volumes of data on fish, wildlife, soils, vegetation, cultural sites, air quality and other information that can be used for the environmental impact statement the Federal Energy Regulatory Commission will prepare. The sponsor plans to apply to FERC in October 2012 for a certificate to construct and operate the pipeline. FERC's review is expected to take about two years.

The sponsor held an "open season" in 2010 at which it solicited pipeline customers. Alaska Pipeline Project officials said they are negotiating with major companies that bid significant volumes.

The sponsor needs commitments for much of its pipeline's capacity to obtain construction financing.

Proposed timeline

October 2012 - Project sponsor plans to apply to the Federal Energy Regulatory Commission for a certificate of public convenience and necessity allowing pipeline construction and operation.

2012-2014 - FERC reviews the application and produces an environmental impact statement.

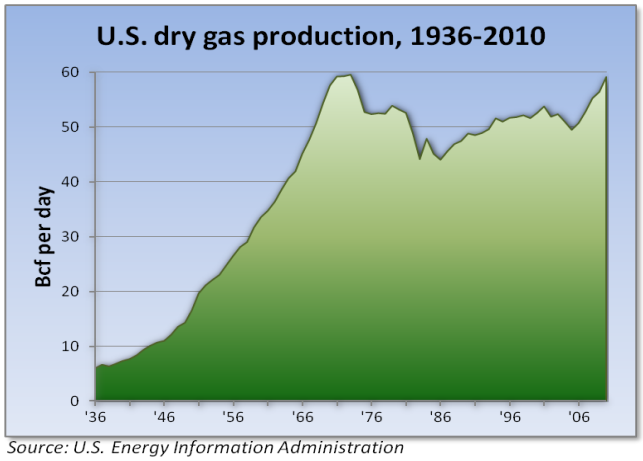
2014 - U.S. and Canadian approvals issued.

2015-2020 - Construction and commissioning.

2020 - First gas flows.

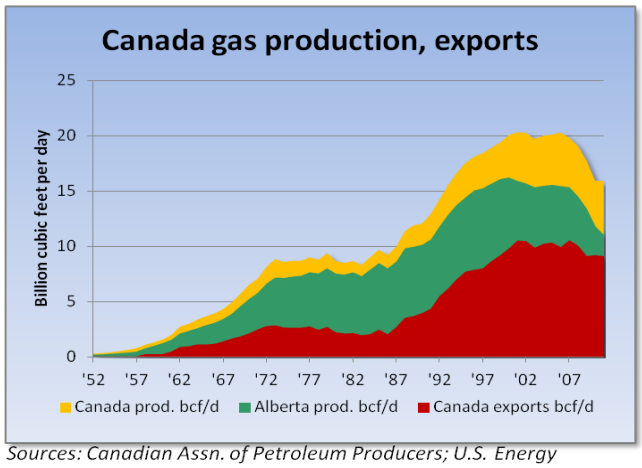
Pluses

- Short-term economic boost to Alaska during construction. Estimated 7,000 jobs during peak construction.
- Likely long-term economic boost as billions of dollars in revenue flows to state treasury, the Alaska Permanent Fund and local governments along the pipeline route.
- Outlet for natural gas now stranded on Alaska's North Slope should spur oil and gas exploration, finding new crude for the trans-Alaska oil pipeline and extra gas for a gas pipeline.



Source: U.S. Energy Information Administration

- With a spur line, consumers in Alaska's Railbelt could be assured of an affordable supply of gas for decades. The project likely is the cheapest source of new natural gas to supplement Cook Inlet supplies in Southcentral Alaska. For the Fairbanks area, relatively inexpensive gas would ease high energy prices for heating and power generation.



Sources: Canadian Assn. of Petroleum Producers; U.S. Energy Information Admin.

- The project might give rise to two industries in Southcentral Alaska, one that exports natural gas liquids and another that exports liquefied natural gas.
- About half of the construction cost could be backed by federal loan guarantees; federal tax breaks are available for pipeline and gas treatment plant.

Minuses

- High cost makes project risky for lenders that would supply construction financing.
- Requires major gas shippers — likely the North Slope producers — to commit to using the pipeline for at least 20 years.
- Not knowing what natural gas market prices will be over that long time horizon makes the project extremely risky for gas shippers. Low prices could shrink or eliminate their profits. Prices below $4 per million Btu in early October 2011 are a problem.
- North Slope producers want state of Alaska to set stable fiscal terms for gas production and the pipeline.
- Fairbanks area energy costs remain relatively high until 2020 or later, when natural gas is flowing. Pipeline might not be running before Southcentral Alaska needs supplemental source of natural gas.

Pipeline to Southcentral

A 737-mile, 24-inch buried pipeline from the Prudhoe Bay field on Alaska's North Slope to the Big Lake area of Southcentral Alaska. From there, the gas could flow to consumers, utilities and other industry via the local distribution pipelines of ENSTAR

Project Information
Sponsor: Alaska Gasline Development Corp.
Estimated cost: $5.3 billion to $9.8 billion (2011 dollars)
Route: Parallel the trans-Alaska oil pipeline from Prudhoe Bay to just north of Fairbanks, then continue south to Big Lake, roughly parallel to the Parks Highway
Gas for Alaskans: That is the main purpose of this proposal. Pipeline would supply Fairbanks, Southcentral.
Status: Preliminary planning

Natural Gas Co. Pipeline also would supply the Fairbanks area.

The pipeline would parallel the trans-Alaska oil pipeline from Prudhoe Bay to just north of Fairbanks, then continue south to Big Lake, roughly parallel to the Parks Highway.

The pipeline would move up to 500 million cubic feet of gas per day. The project also is known as the "bullet line," the in-state line and the Alaska Stand Alone Pipeline, or ASAP.

Sponsor

Alaska Gasline Development Corp., a state agency the Legislature created in 2010.

Estimated cost

$5.3 billion to $9.8 billion (2011 dollars). Sponsor is using midpoint of $7.52 billion as a working number.

The cost includes a $1.84 billion gas treatment plant at the Prudhoe Bay field to remove water, carbon dioxide and other impurities from the gas, then compress the raw gas before it enters the pipeline.

Project cost does not include a separate 35-mile spur line as well as local gas distribution network needed for Fairbanks. A local gas pipeline network already exists in Southcentral.

Gas for Alaskans

Gas for Alaskans was the main idea for this project when the state Legislature funded a feasibility study in 2010.

Status

Project is in its very early stages. Feasibility study issued in July 2011 provided a preliminary plan, and the sponsor recommends the state spend an additional $370 million to firm up the design, cost estimates and engineering, acquire permits and seek customers that would ship gas through the pipeline.

Proposed timeline

2011-2015 - Project sponsor sharpens engineering and cost estimate, obtains permits, solicits customers.

2015-2018 - Construction and commissioning.

2018-2019 - First gas flows.

Pluses

- Short-term economic boost to Alaska during construction of multibillion-dollar project.
- The project could deliver gas to Fairbanks and Southcentral two years sooner than the larger pipeline to Alberta.
- Consumers in Alaska's Railbelt could be assured of an affordable supply of gas for decades. In Southcentral Alaska, the gas could supplement Cook Inlet supplies used for heating and power generation. Delivering natural gas to Fairbanks could greatly lower that community's high cost of energy.
- The project might give rise to new industries in Southcentral Alaska, one that exports natural gas liquids and another that exports liquefied natural gas.

Minuses

- Likely requires state to issue billions of dollars in revenue bonds.
- The cost estimate is soft. A much higher cost than the midpoint $7.52 billion estimate would alter the project economics.
- Requires major gas shippers to make long-term commitments to use the pipeline.
- The project would produce far less new state revenue than the Alberta pipeline due to the small volume of gas moved and the state's tax structure.
- Requires the state to bear all of the pre-construction cost because no private developer will do so.
- Project sponsor wants state law to exempt the pipeline's shipping charges, or tariffs, from regulation.
- The cost of gas to Alaskans would be higher than gas from the larger pipeline to Alberta.
- The project would not spark as much Arctic oil and gas exploration as the larger pipeline.
- The project relies on a chain of assumptions about demand for gas that must come true to make the gas as affordable to Alaskans as predicted. These assumptions include:

1. A revived liquefied natural gas export plant at Nikiski will take almost half of the daily gas flow.
2. A separate business will invest nearly $1 billion to build a plant in the Matanuska-Susitna Borough to take propane and butane from the gas stream, process them and find buyers for them inside or outside Alaska.
3. A major mine, such as the Donlin gold prospect in Western Alaska, will start up by 2019 and consume 6 percent of the daily gas flow.
4. A utility or utilities will build a spur line and a local gas distribution pipeline network in Fairbanks by the time the pipeline from Prudhoe Bay is ready.
5. Cook Inlet gas production will fall to such a point that power plants and the local gas utility in Southcentral Alaska will consume about 20 percent of the pipeline's gas.

Pipeline to Valdez

An 803-mile, 48-inch buried pipeline from the Prudhoe Bay field on Alaska's North Slope to Valdez. From there, the gas would be chilled to minus 260 degrees to create liquefied natural gas, or LNG, that can be shipped on special tankers to markets worldwide.

The pipeline would parallel the trans-Alaska oil pipeline.

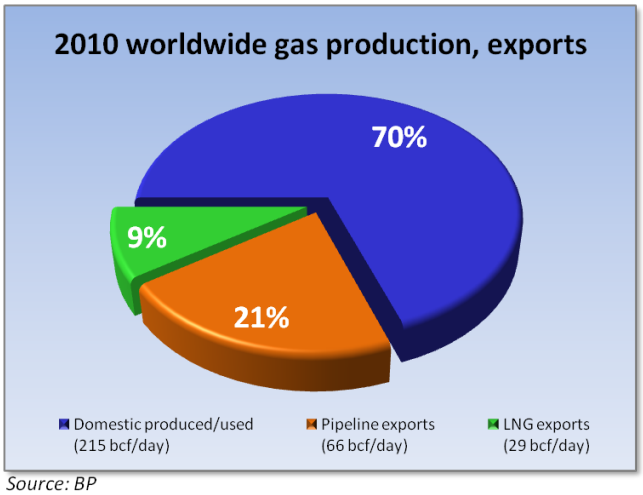
The pipeline would move up to 3 billion cubic feet of gas per day, with Alaskans using some and 2.8 billion arriving in Valdez for export.

Project Information
Sponsors: TransCanada/ ExxonMobil; Alaska Gasline Port Authority
Estimated cost: $43 billion to $49 billion (depending on the project)
Route: Parallel the trans-Alaska oil pipeline from Prudhoe Bay to Valdez
Gas for Alaskans: TransCanada/ Exxon pipeline would provide at least five points in Alaska from which spur lines could be built; Port authority says gas could be taken from the pipeline at Fairbanks and a spur line from Glennallen could provide gas to Southcentral.
Status: No discernible development at this time

Sponsors

Two separate groups have proposed similar concepts for a Valdez pipeline.

TransCanada and ExxonMobil, which are pursuing the pipeline from Alaska to Alberta, also asked potential



Source: BP

gas shippers in 2010 if they prefer a Valdez route, but they have not disclosed the results. Their concept calls for someone else to build the multibillion-dollar gas liquefaction plant and tanker port in Valdez and procure tankers. TransCanada and ExxonMobil in April 2011 indicated they are focused on the Alberta pipeline project rather than Valdez. (See "Status" below.)

The Alaska Gasline Port Authority, founded in 1999, also has proposed a Valdez LNG project. The port authority is a joint venture of the Fairbanks North Star Borough and Valdez, two local governments along the pipeline route. The port authority has no recent cost estimates for the project.

Estimated cost

$43 billion to $49 billion?

Pipeline: $20 billion to $26 billion (2009 dollars). This TransCanada/Exxon estimate includes $11 billion for the Prudhoe Bay plant to remove water, carbon dioxide and other impurities from the gas, then compress it before it enters the pipeline.

LNG plant and Valdez port: $23 billion? This figure is derived from a July 2011 study for the port authority. Tankers would cost $200 million per ship, the study said.

A 2008 state of Alaska study estimated the liquefaction plant and port would cost $10.8 billion to $17.6 billion.

Gas for Alaskans

The TransCanada/Exxon pipeline would provide at least five points in Alaska from which spur lines could be built to provide gas to Alaskans. This project involves only providing gas takeoff points, not building the spur lines, which would be up to the state, utilities or private companies.

The port authority says gas could be taken from the pipeline at Fairbanks and that a spur line from Glennallen could provide gas to Southcentral Alaska.

Status

This project appears to be dormant.

The TransCanada/ExxonMobil team in April 2011 told the Federal Energy Regulatory Commission that it is focused on design, engineering and regulatory approval for the pipeline to Alberta, not Valdez. FERC in August 2011 said it has received little information on the Valdez proposal and has no plans to conduct an environmental review, which is needed to move project ahead.

The port authority continues to tout the LNG export idea in speeches, op-ed columns and interviews.

Pluses

- Short-term economic boost to Alaska during construction.
- With the right project economics, long-term boost as billions of dollars in revenue flows to state treasury, the Alaska Permanent Fund and local governments along the pipeline route.
- Valdez gets new industry based on LNG export.
- Outlet for natural gas now stranded on Alaska's North Slope should spur oil and gas exploration there.
- LNG markets in Asia pay higher prices than are found in Lower 48 gas markets.
- Relatively inexpensive gas made available for heating and power generation in the Fairbanks area.
- For Southcentral Alaska, project with spur line likely an affordable source of new natural gas to supplement Cook Inlet supplies.

Minuses

- Most expensive option. High cost makes project risky for lenders that would supply construction financing.
- Federal loan guarantees available only for pipeline project that delivers gas to the Lower 48, not projects that would export gas. Lack of federal backing would raise project costs.
- Buyers needed immediately for huge output from LNG plant, with little ramping up of project over time.
- Shippers must commit gas to pipeline for 20-plus years and find long-term buyers for the LNG in a Pacific LNG market that other exporters are targeting.
- Fairbanks area energy costs remain relatively high until pipeline is running.
- Southcentral Alaska could need supplemental source of natural gas before pipeline is finished.

Cook Inlet gas exploration

Project Information
Sponsor: Various drilling companies
Estimated cost: Unknown
Route: Gas from Cook Inlet is transported within the Southcentral region by pipeline.
Gas for Alaskans: This plan would service the Southcentral region. LNG exports are possible.
Status: Currently being pursued by several companies

In June 2011, the U.S. Geological Survey estimated the Cook Inlet region still holds an estimated 19 trillion cubic feet of natural gas that could be produced using current technology.

That's more than double the total Cook Inlet gas production over the past 50 years. But how much of the gas could be produced profitably with current technology likely is a much smaller number, possibly as little as 10 percent.

Separately in June, the Alaska Division of Oil and Gas estimated that Cook Inlet alone could continue to profitably supply all of the region's natural gas needs until 2018-2020, at which time supplemental supplies would be needed. The study said the gas industry must continue investing in the Inlet for this prediction to hold.

The state Legislature over several years has created a package of incentives to boost Cook Inlet gas production.

A key incentive offers up to $25 million in tax credits for the first exploration well drilled from a jack-up rig, up to $22.5 million for the second well drilled by a different company and up to $20 million for a third well by a third producer.

At least two companies are pursuing those incentives. Escopeta Oil moved a jack-up rig to Cook Inlet and started drilling in late summer 2011. Buccaneer Energy hopes to bring in a jack-up rig, partly financed with state money, in 2012.

Another state incentive provides a 20 percent to 65 percent tax credit for oil and gas exploration or development capital spending in Cook Inlet or elsewhere in Alaska.

Importing LNG

In 2011, three Anchorage utilities joined to consider the idea of importing liquefied natural gas to Southcentral Alaska.

Project Information
Advocates: Various utilities
Estimated cost: Unknown
Route: LNG would be brought by tankers to Southcentral for regasification and regional use.
Gas for Alaskans: This would be a stop-gap measure to ensure that Anchorage area has enough gas.
Status: No specific plans have been presented at this time.

ENSTAR Natural Gas Co. supplies gas for residential and business furnaces, and Chugach Electric Association and Municipal Light & Power burn gas to make electricity.

They estimate Cook Inlet fields might not produce enough gas by 2015 to fulfill their needs. The supply gap would start small but grow to as much as 140 million cubic feet a day on average by 2020, they told state utility regulators in June 2011. Their idea is that an import project should be scalable so that more gas could come in as the utilities' needs grow.

Since then, the USGS and Alaska Division of Oil and Gas have issued rosier projections of Cook Inlet's potential gas supply. But the utilities still think they'll likely need LNG supplies before new discoveries are producing or a pipeline is built.

The utilities continue to explore the cost, design, location, volumes needed, potential suppliers, regulatory issues and other aspects of opening an LNG import plant. While the USGS and state say there's a high probability that Cook Inlet's gas prospects are better than previously thought, that's short of the certainty of supply the utilities need.

Gas to Fairbanks by truck or pipe

Three ideas have been floated for getting North Slope natural gas to the Fairbanks area, where energy costs are much higher than in Southcentral Alaska.

LNG trucked to Golden Valley Electric and the Flint Hills refinery

In August 2011, Golden Valley Electric Association and Flint Hills Resources announced a project to buy North Slope gas, superchill it to make LNG and truck it about 500 miles to North Pole.

Project Information
Sponsor: Golden Valley Electric Association and Flint Hills Resources
Estimated cost: $200 million
Route: Trucks would transport the LNG down the Dalton Highway from Prudhoe Bay and then to North Pole, Alaska.
Gas for Alaskans: This project would bring gas only to the Fairbanks area.
Status: Currently engineering the project, but in very early stages

They pegged the cost at $200 million, including an LNG plant, about 40 trucks, storage, plus a plant to regasify the LNG in North Pole. Startup would be early 2014. They said engineering has begun, but the project is in its very early stages of development.

Both companies said they would use the gas — about 20 million cubic feet a day on average — to replace more expensive fuels. Golden Valley would burn the gas at its North Pole power plant and save an

estimated $1 million a month in fuel costs. Flint Hills would burn gas at its North Pole oil refinery.

Fairbanks community leaders said some extra gas could be sold elsewhere in the Fairbanks area. Brian Newton, CEO of Golden Valley, said in late September that the volume trucked could grow. Since August, he said, nine other potential gas users in the area have approached the partnership about getting gas from the trucked LNG.

Trucked LNG to Fairbanks

Project Information
Sponsor: Fairbanks Natural Gas, a division of Pentex Alaska Natural Gas
Estimated cost: Unknown
Route: Trucks would transport the LNG down the Dalton Highway from Prudhoe Bay and then to Fairbanks.
Gas for Alaskans: This project would bring gas only to the Fairbanks area.
Status: No discernible development at this time

Fairbanks Natural Gas also has a plan to truck North Slope LNG to Fairbanks.

The company, a subsidiary of Minnesota-based Pentex Alaska Natural Gas, has been liquefying Cook Inlet gas and trucking it to Fairbanks since 1998. Last year it posted a $3 million profit on $16.1 million in gas operating revenue, according to filings with state utility regulators.

Fairbanks Natural Gas has contracted for Cook Inlet gas supplies into mid-2013. But with overall Cook Inlet output falling, several years ago a Fairbanks Natural Gas affiliate, Polar LNG, contracted with ExxonMobil to buy gas from the oil company's Prudhoe Bay production. In 2009, it leased state land near Prudhoe Bay as a site for an LNG plant.

The LNG plant hasn't been built yet. With Golden Valley and Flint Hills pursuing their own trucked LNG idea, Fairbanks Natural Gas may have lost two potential major customers. It's unclear what happens next to its trucked LNG project.

In August 2011, the Alaska Gasline Port Authority dropped its idea to buy Fairbanks Natural Gas to take over its trucked North Slope LNG proposal.

Piped natural gas to Fairbanks

Fairbanks Pipeline Co. started in 2010 and is proposing a Prudhoe Bay-to-North Pole pipeline to deliver natural gas to Interior Alaska customers. Fairbanks Pipeline is owned by Energia Cura, a Fairbanks energy consulting and service business.

Project Information
Sponsor: Fairbanks Pipeline Company (Energia Cura)
Estimated cost: $709 - 716 million
Route: Prudhoe Bay to the Fairbanks area following state highways
Gas for Alaskans: This project would bring gas to the Fairbanks area, but sponsor would consider handling extra gas for Southcentral.
Status: Planning stages

The company said it is targeting Golden Valley Electric, military bases, trans-Alaska pipeline pump stations and mines, as well as Fairbanks Natural Gas, the small local gas utility. It has estimated the 514-mile, 12-inch buried pipeline would cost $709 million to $716 million, but the company now believes the cost will be lower after hearing from steel mills that could supply the pipe. The route would follow state highways. The Energia owners are funding development costs, the company website says. They hope others, including the state, possibly through its Permanent Fund savings account, become owners.

Fairbanks Pipeline held an open season soliciting customer interest during the third-quarter of 2010 and said it got non-binding interest for 32 million cubic feet of gas a day as of 2014, ramping up to 52 million in 2019. Gas buyers would pay $9.66 per thousand cubic feet, under the plan. The company also is considering a larger, 18-inch pipeline project that, besides serving Interior Alaska markets, also would deliver about 200 million cubic feet a day to Southcentral.

For more information, please visit our website: www.arcticgas.gov

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